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IS 13630-5 (2006): Ceramic Tiles - Methods of Test, Sampling and Basis of Acceptance, Part 5: Determination of resistance to thermal shock (see IS 13630 : Parts 1 to 15) [CED 5: Flooring, Wall Finishing and Roofing]



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IS 13630 (Part 5) : 2006

भारतीय मानक
सिरैमिक टाइलें - परीक्षण पद्धतियाँ,
नमूने लेने तथा स्वीकार्यता का आधार
(पहला पुनरीक्षण)

Indian Standard

CERAMIC TILES — METHODS OF TEST,
SAMPLING AND BASIS FOR ACCEPTANCE

(First Revision)

ICS 91.100.23

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (Parts 1 to 15) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in various parts in 1992-93. This is the first revision; having all parts combined in one publication, of the standard in which the following major changes have been incorporated:

- a) As per the decision taken in the last meeting, the requirements of all the parts have been included in one volume and the revised standard has been brought in line with ISO 10545 (various parts).
- b) The requirements for determination of bulk density have been added in Part 2 and a few changes have been made in the requirements for determination of water absorption.
- c) A few modifications have also been made in Part 3.
- d) Requirements for determination of breaking strength have also been added in Part 6.
- e) Requirements for determination of glazing resistance tests have also been modified in Part 9.
- f) A new test for determination of impact resistance by measurement of co-efficient of restitution has been added as Part 14.
- g) IS 13711 : 1993 'Sampling and basis for acceptance' has been amalgamated with Part 15 of this standard.

In formulation of this standard considerable assistance have been derived from the following standards:

ISO 10545-1 : 1995 Ceramic tiles — Part 1 : Sampling and basis for acceptance

ISO 10545-2 : 1995 Ceramic tiles — Part 2 : Determination of dimensions and surface quality

ISO 10545-3 : 1995 Ceramic tiles — Part 3 : Determination of water absorption, apparent porosity, apparent relative density and bulk density

ISO 10545-4 : 2004 Ceramic tiles — Part 4 : Determination of modulus of rupture and breaking strength

ISO 10545-5 : 1996 Ceramic tiles — Part 5 : Determination of impact resistance by measurement of coefficient of restitution

ISO 10545-6 : 1995 Ceramic tiles — Part 6 : Determination of resistance to deep abrasion for unglazed tiles

ISO 10545-7 : 1996 Ceramic tiles — Part 7 : Determination of resistance to surface abrasion for glazed tiles

ISO 10545-8 : 1994 Ceramic tiles — Part 8 : Determination of linear thermal expansion

ISO 10545-9 : 2004 Ceramic tiles — Part 9 : Determination of resistance to thermal shock

ISO 10545-10 : 1995 Ceramic tiles — Part 10 : Determination of moisture expansion

ISO 10545-11 : 1994 Ceramic tiles — Part 11 : Determination of crazing resistance for glazed tiles

ISO 10545-12 : 1995 Ceramic tiles — Part 12 : Determination of frost resistance

ISO 10545-13 : 1995 Ceramic tiles — Part 13 : Determination of chemical resistance

ISO 10545-14 : 1995 Ceramic tiles — Part 14 : Determination of resistance to stains

ISO 13006 : 1998 Ceramic tiles — Definitions, classification, characteristics and marking

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CERAMIC TILES — METHODS OF TEST, SAMPLING AND BASIS FOR ACCEPTANCE

PART 5 DETERMINATION OF RESISTANCE TO THERMAL SHOCK

(First Revision)

1 SCOPE

This standard (Part 5) covers a method of test for determining the resistance to thermal shock of all ceramic tiles in normal conditions of use.

Depending on the water absorption of the tiles, different procedures (tests with or without immersion) are used unless there is an agreement to the contrary.

2 PRINCIPLE

Determination of resistance to thermal shock of a whole tile by cycling 10 times between the temperature of cold water and a temperature just above that of boiling water. Usually tests are carried out between 15°C and 145°C.

3 APPARATUS

3.1 Low Temperature Bath — Through which cold water flows at $15 \pm 5^\circ\text{C}$. One example is a bath 550 mm long, 350 mm wide and 220 mm deep with water flow rate of 4 litre/min. Any other suitable apparatus may be used.

3.1.1 Testing with Immersion — In the case of all tiles having water absorption not greater than 10 percent the bath is not covered and is of sufficient depth to allow the tiles to be placed vertically and immersed completely.

3.1.2 Testing without Immersion — In the case of glazed tiles having water absorption greater than 10 percent, the bath is covered with a 5 mm thick aluminium plate in such manner that the water, directed towards the surface is in contact with the plate. Covering the aluminium plate is a layer of aluminium grains approximately 5 mm thick with diameters in the range of 0.3 mm to 0.6 mm.

3.2 Oven — Capable of operation at 145°C to 150°C.

4 TEST SPECIMENS

A minimum of five test specimens shall be used.

5 PROCEDURE

5.1 First examine the tiles for visible defects by viewing them with the naked eye (with the aid of spectacles if usually worn) from a distance of 25 cm to 30 cm under

an illumination of approximately 300 lux. All the test specimens shall be free from defects at the commencement of test. The methylene blue solution described in 5.5 may be used to detect pretest defects.

5.2 For Testing with Immersion

In the case of low porosity tiles having water absorption not greater than 10 percent, immerse them vertically in cold water at $15 \pm 5^\circ\text{C}$ so that they are not in contact with each other.

5.3 For Testing without Immersion

In the case of glazed tiles having water absorption greater than 10 percent, place the glazed surface downwards in contact with the aluminium grains over the cold water bath at $15 \pm 5^\circ\text{C}$.

5.4 Temperature Cycling

For both procedures, after 5 min at the low temperature, immediately transfer the test specimens to the oven and keep it at 145°C to 150°C until a uniform temperature is achieved (usually 20 min), and then immediately transfer them back to the low temperature conditions.

Repeat this procedure 10 times.

5.5 Examination

Then examine the test specimens for visible defects by viewing them with the naked eye (with the aid of spectacles if usually worn) from a distance of 25 cm to 30 cm under an illumination of approximately 300 lux. To assist in detecting defects, a suitable stain (such as 1 percent aqueous solution of methylene blue containing a small quantity of wetting agent) may be brushed onto the glazed surfaces of the test specimens. After 1 min, wipe off the stain with a damp cloth.

6 TEST REPORT

The test report shall contain the following:

- a) Description of the tiles;
- b) Water absorption coefficient of the tiles;
- c) Type of test performed (with or without immersion); and
- d) Number of test specimens with visible defects.

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This Indian Standard has been developed from Doc: No. CED 5 (7358 to 7372).

Amendments Issued Since Publication

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